

LIS Verification Toolkit (LVT)

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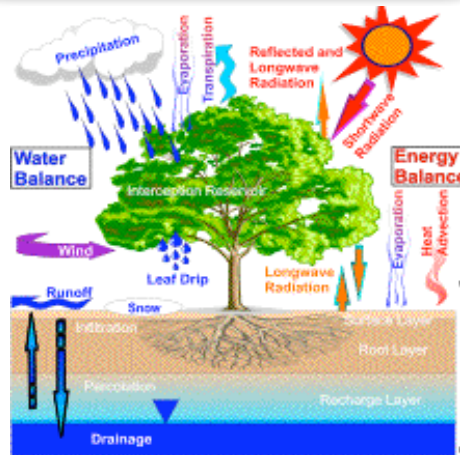
The comparison and generation of error statistics (RMSE, Bias, ...) is a tedious process and requires interpretation of observations, analysis and the development of additional codes/scripts

LVT provides a consolidated system that enables rapid evaluation of LIS model output to different observations - for benchmarking, evaluation and validation

LVT



Land Surface Models (Noah,
CLM, Catchment, Mosaic,
HySSIB, SiB2, Sacramento,
SNOW17)

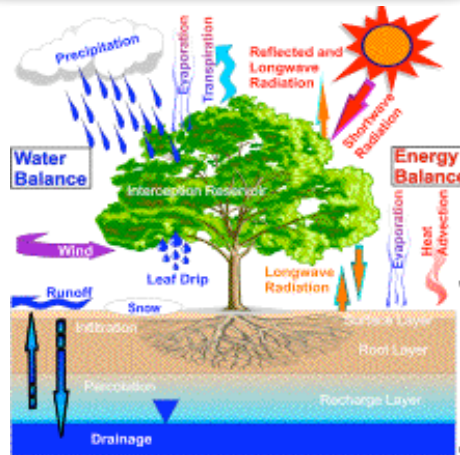


Water and Energy
Fluxes, Soil Moisture and
Temperature profiles,
Land surface states

(Binary, Grib, NETCDF)

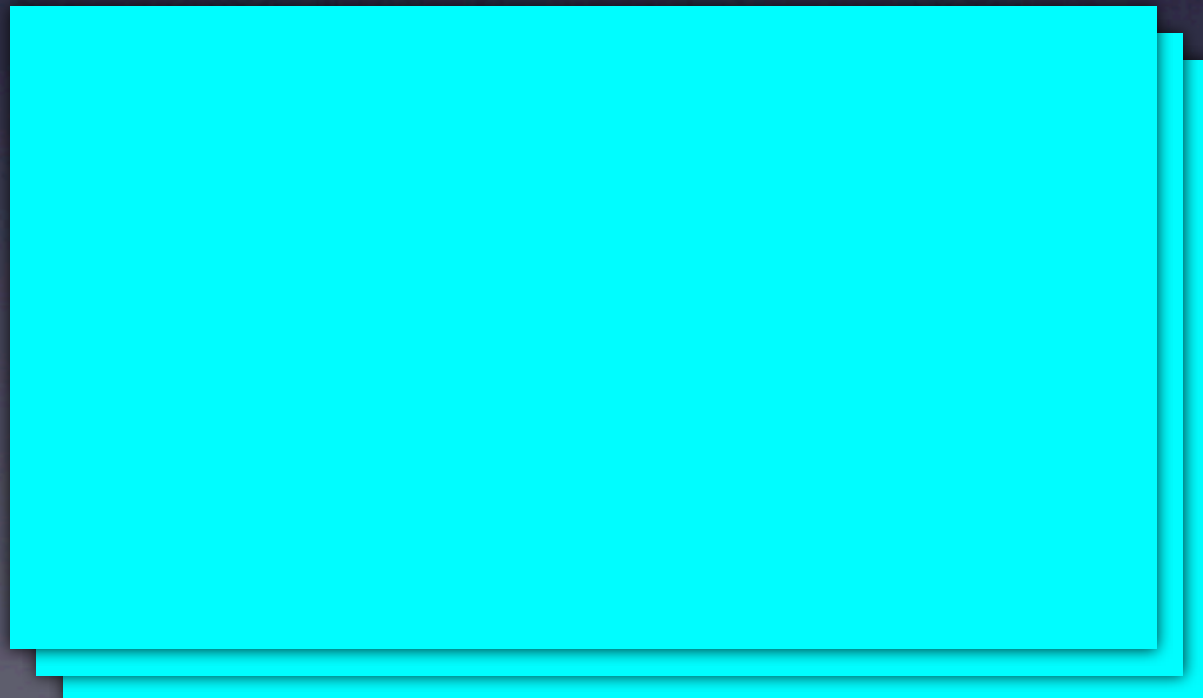
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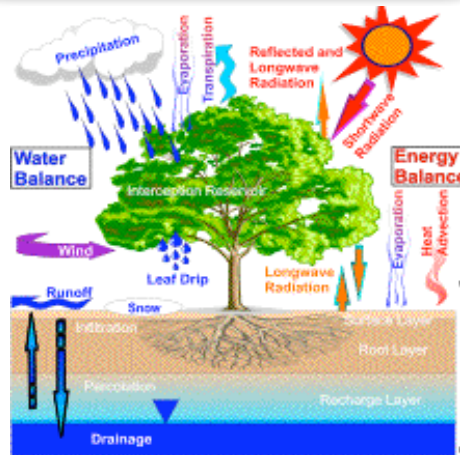
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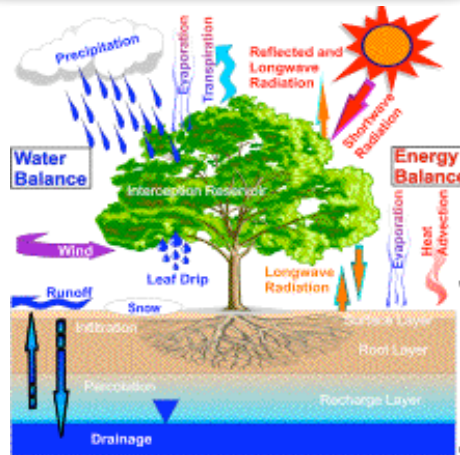
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LIS

SURFRAD SCAN CEOP SNOTEL AMERI
FLUX

OBS

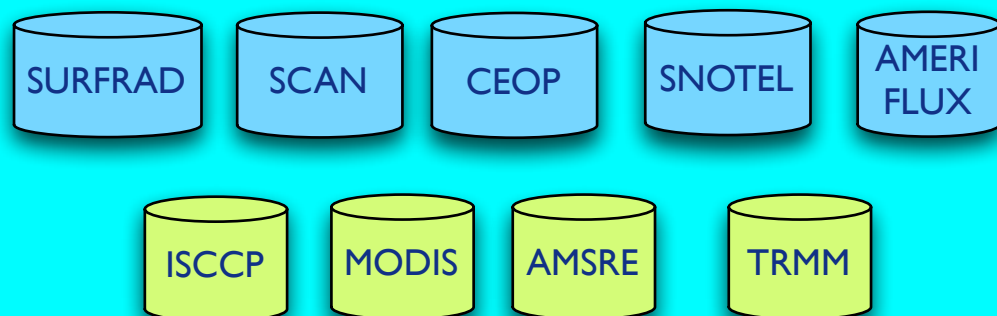
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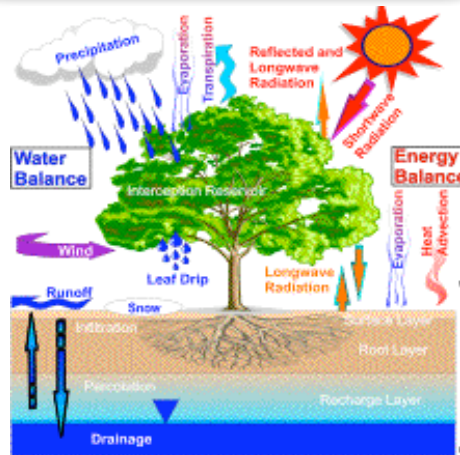
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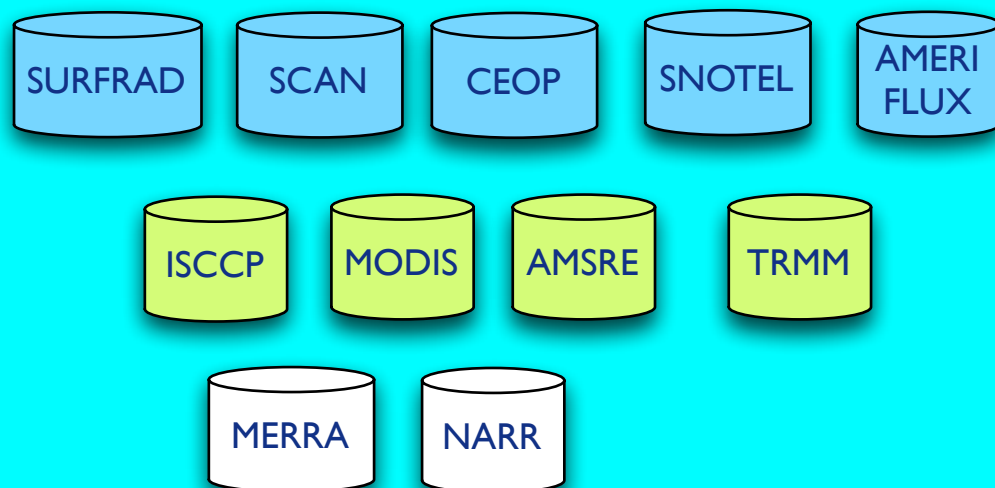
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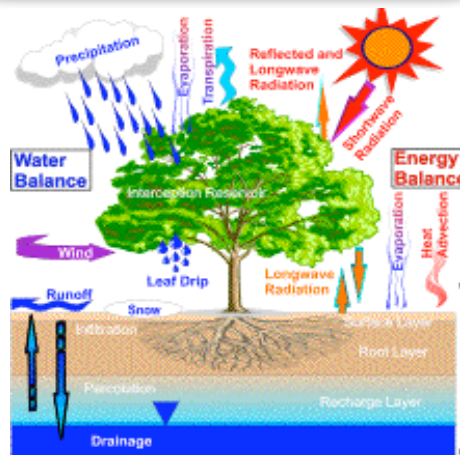
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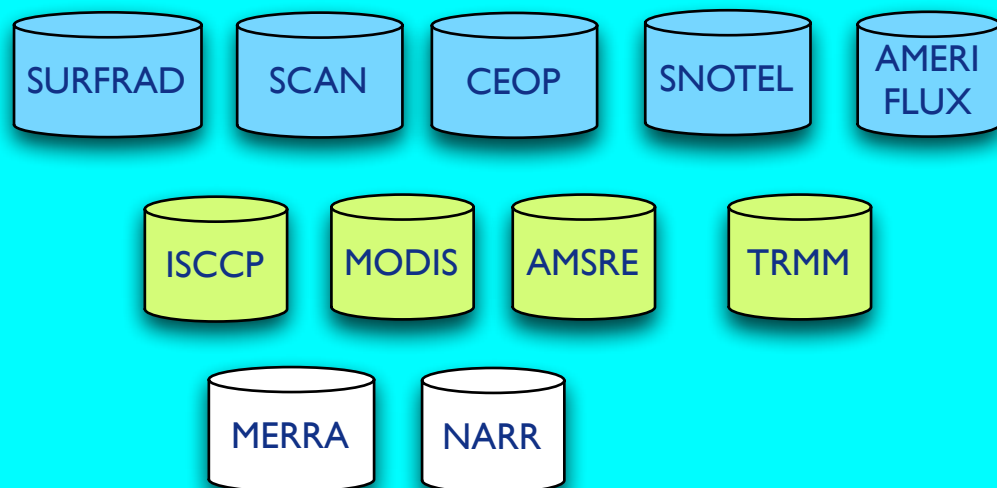
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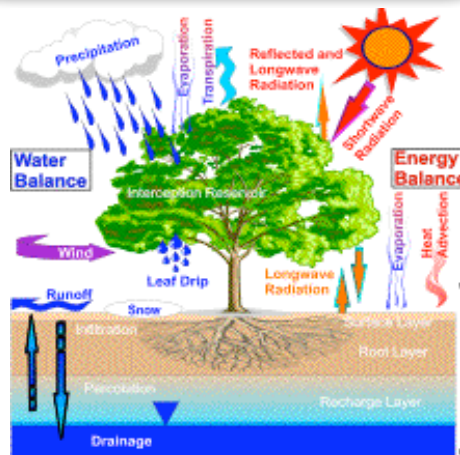
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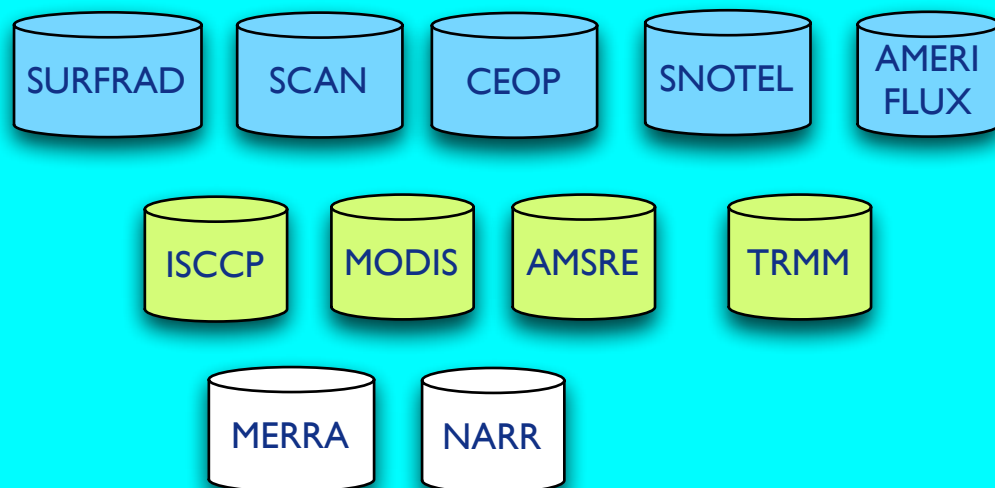
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Spatial upscaling/
downscaling,
Temporal averaging

Error Statistics
(RMSE, Bias,
Correlations, ..)

Analysis Statistics
(Mean, Std, ..)

Data Assimilation
diagnostics
(Innovation
distribution)



OBS

Configurable Interface


```
#LIS output details
Experiment code:      111
Starting year:        2002
Starting month:       6
Starting day:         19
Starting hour:        0
Starting minute:      0
Starting second:      0
Ending year:          2008
Ending month:         12
Ending day:          31
Ending hour:         0
Ending minute:        0
Ending second:        0
LIS Output timestep:  10800
Undefined value:      -9999
LVT diagnostic file:  ctrlrun
LIS Output methodology: 2
LIS Output directory: ../../Control/OUTPUT

#LIS domain
run domain lower left lat: 25.875
run domain lower left lon: -124.875
run domain upper right lat: 52.875
run domain upper right lon: -67.875
run domain resolution dx: 0.25
run domain resolution dy: 0.25
```

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Starting year:        2002
Starting month:       6
Starting day:         19
Starting hour:        0
Starting minute:      0
Starting second:      0
Ending year:          2008
Ending month:         12
Ending day:          31
Ending hour:          0
Ending minute:        0
Ending second:        0
LIS Output timestep:  10800
Undefined value:      -9999
LVT diagnostic file:  ctrlrun
LIS Output methodology: 2
LIS Output directory: ../../Co

#LIS domain
run domain lower left lat: 25.8
run domain lower left lon: -12
run domain upper right lat: 52
run domain upper right lon: -6
run domain resolution dx: 0.
run domain resolution dy: 0.

#stats specifications (only applicable to retrospective mode)
Apply external mask:      0
External mask directory:  ../../DMASK/
Compute Mean:             0
Compute Std:              0
Compute RMSE (Total):     0
Compute Bias (Total):     0
Compute RMSE (Time Series): 0
Compute Bias (Time Series): 0
Compute Anomaly Correlations: 1
Compute Innovation Distribution: 0
Temporal averaging interval: 86400
Stats output directory:   ./STATS.ctrl
Stats output interval:    86400
Extract time series:      0
Time series location file: ./STN_LOCATIONS.DAT

```

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Current Status and Ongoing Work

Includes a number of common field data products - SCAN, CEOP, COOP (snow), etc.

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More diagnostic metrics - Threat scores, uncertainty measures, etc.

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